LAB Programe - 1

Develop a Java program that prints all real solutions to the quadratic equation $ax^2 + bx + c = 0$. Read in a, b, c and use the quadratic formula. If the discriminate $b^2 - 4ac$ is negative, display a message stating that there are no real solutions.

Algothi Algorithm:-

1) Take input of values a, b, c.

2) calculate the $D = b^2 - 4ac$ value.

3) if D is positive print the real roots. use formaula

$$r = \frac{-b \pm \sqrt{D}}{2a}$$

4) if D is negative print the imaginary roots using

$$r = \frac{-b \pm i\sqrt{D}}{2a} = \frac{-b \pm \sqrt{-D}}{2a}$$

Programe:-

```
import Java.util.*;

class Qudratic Equations {
    public static void main (String args[]) {
        double r1, r2;
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter a,b,c value : ");
```

```java
double a = sc.nextDouble();
double b = sc.nextDouble();
double c = sc.nextDouble();

double D = b*b - 4*a*c;

if(D<0){
    System.out.println("Imaginary root1:"+
        (-b/2*a) + "+" + "("+Math.sqrt(-D)/2*a)+ "i");
    System.out.println("Imaginary root2:"+ (-b/2*a)+
        "-"+"("+Math.sqrt(-D)/2*a) + "i");
}
else{
    r1 = (-b + Math.sqrt(D))/2*a;
    r2 = (-b + Math.sqrt(D))/2*a;
    System.out.println("real root1:" +r1);
    System.out.println("real root2:"+r2);
}
}
```

Output:

Enter a,b,c value:
1
-2
2
Imaginary root1: 1.0+1.0i
Imaginary root2: 1.0+1.0i

LAB 2 programs:-

Develop a Java program to create a class Student with members usn, name, an array credits & an array marks. Include methods to accept & display details and a method to calculate SGPA of a student.

Algorithm:-

Take input of usn, name, credits, marks.

accept() will assign values to the usn, name, credits marks.

FindSgpa() will calculate the Sgpa of the Student; (from for loop we get sum of (credits * marks of each subject)

then Find Sgpa by using formula

$$Sgpa = \left(\frac{Total\ Sum}{(credits * marks)}\right) \Big/ \left(Sum\ of\ credits\right)$$

display() will display USN, Name, total marks, Sgpa.

Program:

```java
import java.util.*;

class Student {
    int Usn; name
    int [] credits = new int[100];
    int [] marks = new int[100];
    String name;
    void accept(int usn, int[] credits, int[] marks,
                String name) {

        this.Usn = Usn;
        this.credits = credits;
        this.marks = marks;
        this.name = name;
    }

    void display(double tot, int Sgpa) {
        System.out.println("\nName: "+name+"\nUsn"
                +usn+"\nTotal marks: "+tot+"\nSgpa: "
                +Sgpa);
    }

    int findSgpa(int vsum) {
        int Sgpa; int sum=0, v=0;

        for(int x: marks) {
            sum += (credits[v++] * x); }
        Sgpa = sum/(vsum*10);
        return(Sgpa);
    }
}
```

```java
class StudentTest {
    public static void main (String args[]){
        int vsn, n;
        int Sgpa, sum=0, msum=0;
        int[] credits;
        int[] marks;
        String name;
        Scanner sc = new Scanner (System.in);
        System.out.println ("Enter the Number of Subjects");
        n = sc.nextInt();
        credits = new int[n];
        marks = new int[n];
        System.out.println ("Enter the name of the Student");
        name = sc.next();
        System.out.println ("Enter the USN of the Student");
        usn = sc.nextInt();
        for (int i=0; i<n; i++)
        {
            System.out.println ("Enter the Credits & Marks of the
            Subject" + (i+1));
            credits[i] = sc.nextInt();
            marks[i] = sc.nextInt();
        }
        Student1 s1 = new student1();
        for (int x : credits){
            sum += x;}
        for (int y : marks){
            msum += y;}
        s1.accept(usn, credits, marks, name);
        Sgpa = s1.Find Sgpa(sum);
        s1.display(msum, sgpa);
    }
}
```